NOTES TO DESIGNER

1 REFER TO LANL FACILITY CONSTRUCTION SPECIFICATIONS SECTION 15185.

2 REVIEW DETAILS AND REVISE AS NEEDED TO SUIT PROJECT REQUIREMENTS.

3 COOLING TOWER DESIGN CONDITIONS:

WATER IN (TWR) 85° > 10° TD RANGE
WATER OUT (TWS) 75°
WET BULB 75° > 75° TD APPROACH

4 TOWER PUMP FLOW:

$$\text{GPM CIRCULATED} = \frac{\text{SYSTEM LOAD (BTUH)}}{500 \times (T\ ^\circ F\ (TWR) - T\ ^\circ F\ (TWS)}$$

5 COOLING TOWER WATER EVAPORATION:

GPM EVAPORATED = GPM CIRCULATED X TD RANGE X 0.0008

6 SEPARATOR BLOW DOWN (DRAIN):

$$\text{GPM CIRCULATED} = \frac{\text{COOLING TOWER GPM EVAPORATED}}{\text{NUMBER OF CYCLES} - 1}$$

CYCLES = RATIO OF TOTAL DISSOLVED SOLIDS (TDS) OF TOWER WATER DIVIDED BY TDS OF MAKE-UP WATER. BASE CALCULATION ON CYCLES = 2.5

7 SYSTEM NON-POTABLE MAKEUP WATER (NPMW):

NPMW = GPM EVAPORATE + GPM BLOW DOWN

8 CHECK NPSH REQUIRED FOR COOLING TOWER PUMP VERSUS NPSH AVAILABLE.

9 SPECIFY STRAINER DOWNSTREAM OF COOLING TOWER PUMP.

10 SPECIFY BALL TYPE SHUTOFF VALVES FOR SIZES 2" AND SMALLER AND BUTTERFLY TYPE FOR SIZES 2 1/2" AND LARGER. USE LUG BODY STYLE BUTTERFLY VALVES, BOLTED FOR DEAD END SERVICE, WITH GEAR ACTUATOR.

11 UNIONS ARE NOT REQUIRED FOR FLANGED VALVES AND CONNECTIONS.

12 SEPARATOR:

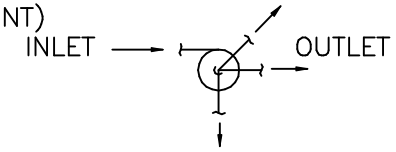
A SIZE SEPARATOR FOR 10% OF SYSTEM FLOW.

B MINIMUM INLET PRESSURE SHOULD BE AT LEAST 15 PSI OR EQUAL TO THE PRESSURE LOSS ANTICIPATED THROUGH THE SEPARATOR PLUS THE SYSTEM DOWNSTREAM PRESSURE REQUIREMENTS.

C SPECIFY A FLANGED SPOOL PIECE ON THE OUTLET OF THE SEPARATOR IN ORDER TO REMOVE THE UPPER FLANGED DOME FOR MAINTENANCE. REFER TO THE MANUFACTURER'S CATALOG DATA FOR RECOMMENDED SPOOL PIECE LENGTH.

D PIPE CONNECTIONS TO THE INLET AND OUTLET OF THE SEPARATOR SHOULD BE A STRAIGHT RUN OF AT LEAST 5 PIPE DIAMETERS (INCLUDING OUTLET SPOOL PIECE) TO MINIMIZE TURBULENCE. NOTE THE STRAIGHT PIPE LENGTH ON THE PIPING DRAWINGS. RECOMMENDED DIRECTION OF INLET/OUTLET PIPING TO CONTROL VIBRATION:

12 SEPARATOR (CONT)



13 SIZE COOLING TOWER DRAIN AND OVERFLOW PIPING TO MATCH COOLING TOWER CONNECTIONS.

14 LOCATE FLOOR DRAINS CLOSE TO COOLING TOWER CONTROL SYSTEM

15 LOCATE CONTROL CABINET AND CHEMICAL TANKS IN AN ACCESSIBLE AREA SO SYSTEM CAN BE MAINTAINED AND DRUMS REPLACED.

16 REFER TO SECTION 204 IN THE MECHANICAL CHAPTER FOR WATER DISCHARGE REQUIREMENTS.

NO.	DATE	CLASS REV	REVISIONS	APP

FACILITY ENGINEERING MANUAL

CHEMICAL WATER TREATMENT SYSTEM FOR OPEN COOLING TOWERS

DESIGN NOTES

APPROVED: DISCIPLINE POC	DATE:
DANNY NGUYEN	6-28-99

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